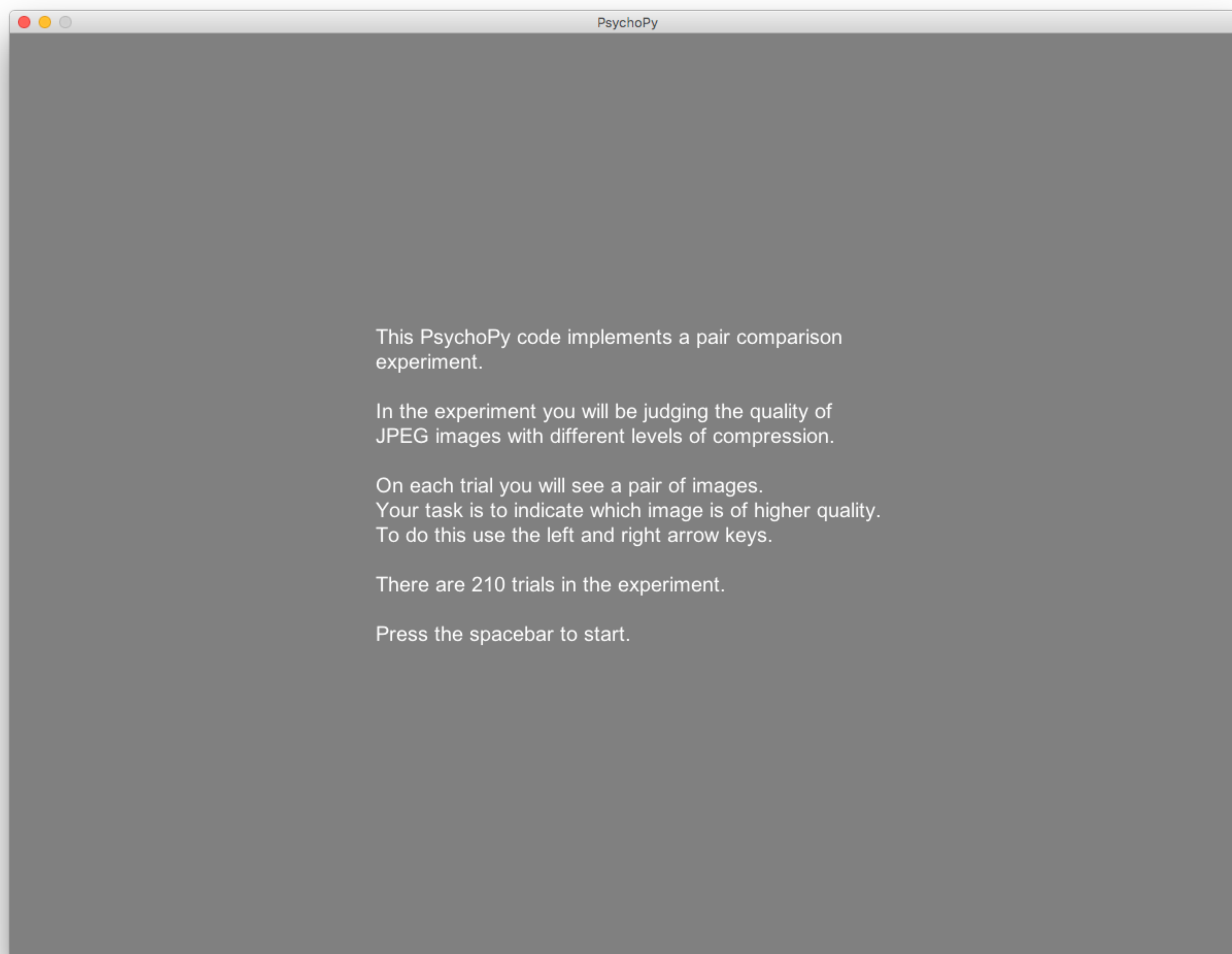


Lab 5 assignment: pair comparison experiment



1. Download the **paircomp.zip** file that contains the code and resources for the pair comparison experiment from myCourses. Unzip the file to extract the code and resources.
2. Use PsychoPy to run yourself through the experiment.
 - 2.1. Make sure to use a unique participant id so you can find results .csv file.

Lab 5 assignment: pair comparison analysis

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
	img2_id	img1_id	trials.thisRep	trials.thisTri	trials.thisN	trials.thisInd	resp.keys	resp.corr	resp.rt	session	participant	frameRate	img2_side	resp_corr	expName	img1_side	date	
1	75	50	0	0	0	4	left	1	5.0467031	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
2	65	50	0	1	1	2	left	1	1.82173896	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
3	55	50	0	2	2	0	right	0	9.07191396	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
4	75	70	0	3	3	18	right	1	6.39873815	1	jaf50805	59.8372499	right	right	paircomp	left	2017_Nov_15_1010	
5	70	60	0	4	4	12	left	1	5.86566591	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
6	75	60	0	5	5	13	right	1	1.70451593	1	jaf50805	59.8372499	right	right	paircomp	left	2017_Nov_15_1010	
7	80	50	0	6	6	5	left	0	2.38916397	1	jaf50805	59.8372499	right	right	paircomp	left	2017_Nov_15_1010	
8	80	60	0	7	7	14	left	1	2.40823817	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
9	80	75	0	8	8	20	right	0	11.192647	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
10	75	65	0	9	9	16	right	0	6.49955702	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
11	65	55	0	10	10	7	left	1	3.86010504	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
12	80	70	0	11	11	19	right	0	5.93123984	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
13	80	55	0	12	12	10	right	0	6.36483097	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
14	70	65	0	13	13	15	right	1	8.07028604	1	jaf50805	59.8372499	right	right	paircomp	left	2017_Nov_15_1010	
15	60	50	0	14	14	1	left	1	2.65759015	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
16	60	55	0	15	15	6	left	1	8.00352693	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
17	80	65	0	16	16	17	right	1	6.08273506	1	jaf50805	59.8372499	right	right	paircomp	left	2017_Nov_15_1010	
18	70	50	0	17	17	3	left	1	5.99981785	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
19	70	55	0	18	18	8	left	1	8.63575292	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
20	65	60	0	19	19	11	right	0	8.85427022	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
21	75	55	0	20	20	9	left	1	3.694242	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
22	65	50	1	0	21	2	right	0	4.66109204	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
23	75	60	1	1	22	13	left	1	1.97220397	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
24	80	60	1	2	23	14	right	1	2.23876214	1	jaf50805	59.8372499	right	right	paircomp	left	2017_Nov_15_1010	
25	65	60	1	3	24	11	right	1	2.49018383	1	jaf50805	59.8372499	right	right	paircomp	left	2017_Nov_15_1010	
26	60	50	1	4	25	1	left	1	10.241344	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
27	80	50	1	5	26	5	right	1	2.12324214	1	jaf50805	59.8372499	right	right	paircomp	left	2017_Nov_15_1010	
28	75	70	1	6	27	18	right	0	2.79114318	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
29	65	55	1	7	28	7	right	1	1.6063211	1	jaf50805	59.8372499	right	right	paircomp	left	2017_Nov_15_1010	
30	70	50	1	8	29	3	right	1	3.92715907	1	jaf50805	59.8372499	right	right	paircomp	left	2017_Nov_15_1010	
31	80	75	1	9	30	20	left	1	4.70573902	1	jaf50805	59.8372499	left	left	paircomp	right	2017_Nov_15_1010	
32	70	55	1	10	31	8	left	0	2.70595789	1	jaf50805	59.8372499	right	right	paircomp	left	2017_Nov_15_1010	
33																		

3. Open the .csv file from the experiment, save the file in .xlsx format.
4. Create a copy of the data on a new page, move to that page, and delete the highlighted rows.

Lab 5 assignment: pair comparison analysis

The screenshot shows a Microsoft Excel spreadsheet with a data table and a Sort dialog box open.

Excel Interface:

- File Name:** jaf50805_paircomp_analysis.xls
- Search Bar:** Search in Sheet
- Tabs:** Home, Layout, Tables, Charts, SmartArt, Formulas, Data, Review
- Font:** Calibri (Body), 12
- Alignment:** abc, Wrap Text, Merge
- Number:** General
- Format:** Conditional Formatting, Styles
- Cells:** Insert, Delete, Format
- Themes:** Themes, Aa

Data Table:

	A	B	C	D
1	img2_id	img1_id	resp.corr	frequency(2>1)
2	55	50	0	
3	55	50	1	
4	55	50	1	
5	55	50	1	
6	55	50	1	
7	55	50	1	
8	55	50	1	
9	55	50	1	
10	55	50	1	
11	55	50	1	9
12	60	50	1	
13	60	50	1	
14	60	50	0	
15	60	50	1	
16	60	50	1	
17	60	50	1	
18	60	50	1	
19	60	50	1	
20	60	50	1	
21	60	50	0	8
22	60	55	1	
23	60	55	1	
24	60	55	0	
25	60	55	0	
26	60	55	1	
27	60	55	0	
28	60	55	1	
29	60	55	0	
30	60	55	1	
31	60	55	1	6
32	65	50	1	
33	65	50	0	

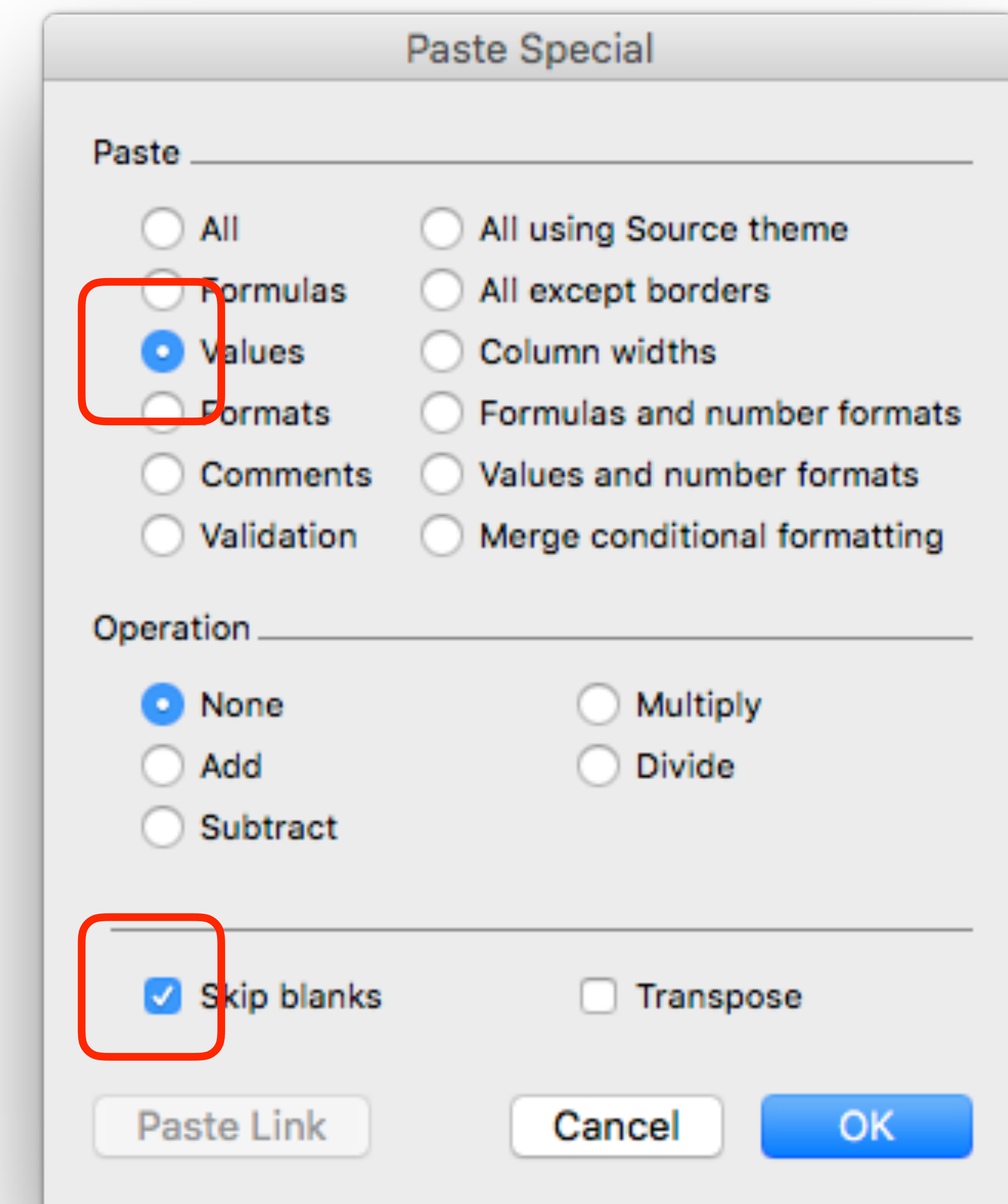
Sort Dialog Box:

- Add levels to sort by:** ☒ My list has headers
- Sort by:** img2_id, Sort On: Values, Order: Smallest to Largest
- Then by:** img1_id, Sort On: Values, Order: Smallest to Largest
- Buttons:** +, -, Copy, Options..., Cancel, OK
- Link:** [Learn about sorting](#)

- Sort all the data by the “img2_id” then by by the “img1_id” column.
- Create a new column called “frequency(2>1)”. In this column calculate the averages of the “resp.corr” values for img2_ids with the same value. This column represents the number of times that image “img2_id” was judged higher in quality than image “img1_id”.
- Select the column headers and the rows that contain the “frequency(2>1)” values. Copy these rows.

Lab 5 assignment: pair comparison analysis

	A	B	C	D	E	F	G	H	I
1	img2_id	img1_id	f(2>1)	f(1>2)		img2_id	img1_id	f(2>1)	f(1>2)
2	55	50	9	1		55	50	9	1
3	60	50	8	2		60	50	8	2
4	60	55	6	4		65	50	6	4
5	65	50	6	4		70	50	9	1
6	65	55	7	3		75	50	10	0
7	65	60	7	3		80	50	8	2
8	70	50	9	1		60	55	6	4
9	70	55	9	1		65	55	7	3
10	70	60	8	2		70	55	9	1
11	70	65	6	4		75	55	10	0
12	75	50	10	0		80	55	8	2
13	75	55	10	0		65	60	7	3
14	75	60	10	0		70	60	8	2
15	75	65	7	3		75	60	10	0
16	75	70	7	3		80	60	9	1
17	80	50	8	2		70	65	6	4
18	80	55	8	2		75	65	7	3
19	80	60	9	1		80	65	10	0
20	80	65	10	0		75	70	7	3
21	80	70	7	3		80	70	7	3
22	80	75	6	4		80	75	6	4
23									
24									
25	F matrix					img 1 quality			
26			50	55	60	65	70	75	80
27		50	9	8	6	9	10	8	
28		55	1	6	7	9	10	8	
29		60	2	4	7	8	10	9	
30		65	4	3	3	6	7	10	
31		70	1	2	4		7	7	
32		75	0	0	3	3		6	
33		80	2	2	1	0	3	4	
34									
35									



- Paste these rows into a new spreadsheet page using the “Paste special” command with the “values” and “skip blanks” items checked as shown.
- Create a new column named “frequency(1>2)” with values equal to 10 - “frequency(2>1)”. This column represents the number of times that image “img1_id” was judged higher in quality than image “img2_id”.

Lab 5 assignment: pair comparison analysis

jaf50805_paircomp_analysis_by_mats.xls

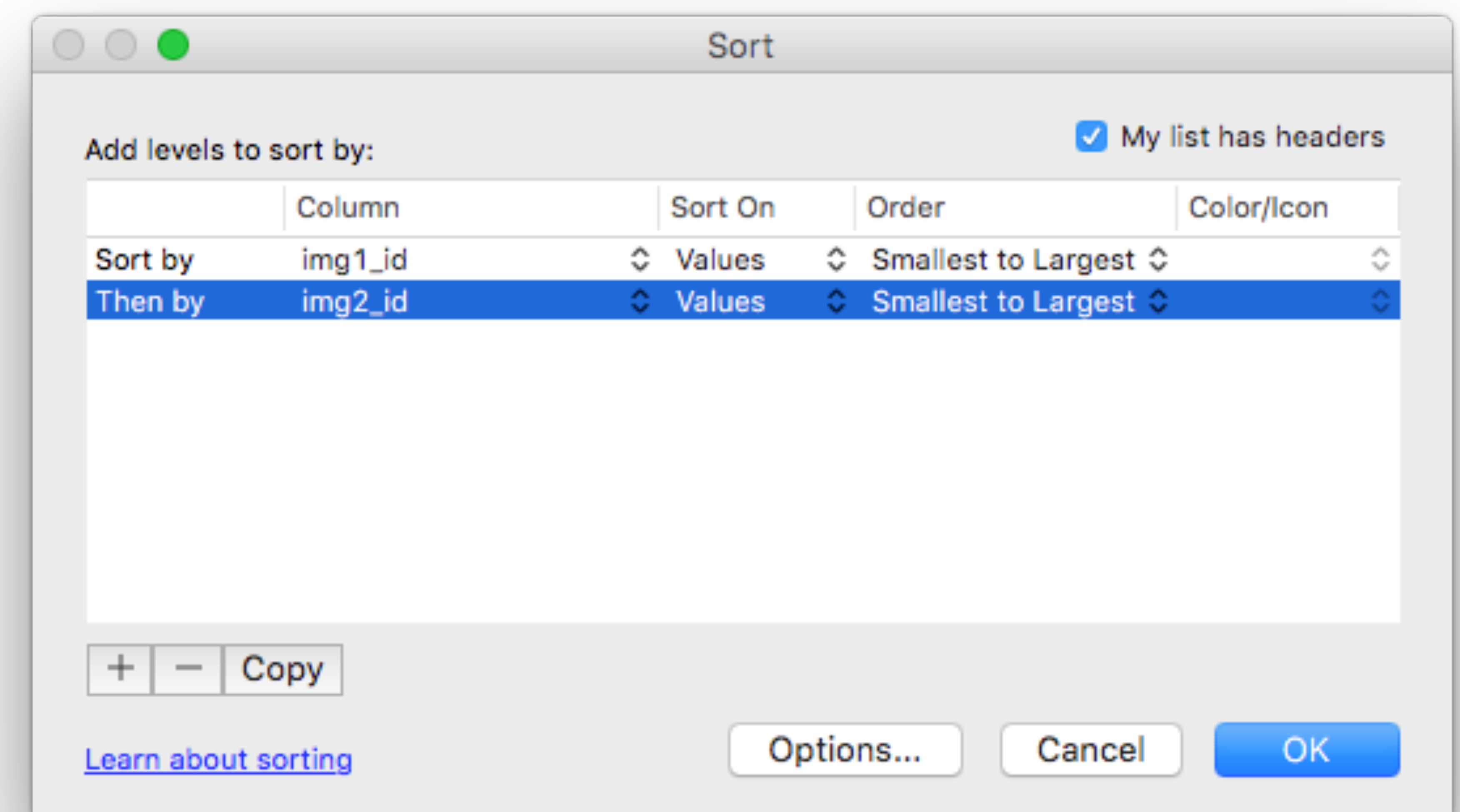
Home Layout Tables Charts SmartArt Formulas Data Review

Insert Chart Insert Sparklines Data Chart Quick Layouts

All Line Column Win/Loss Select Switch Plot

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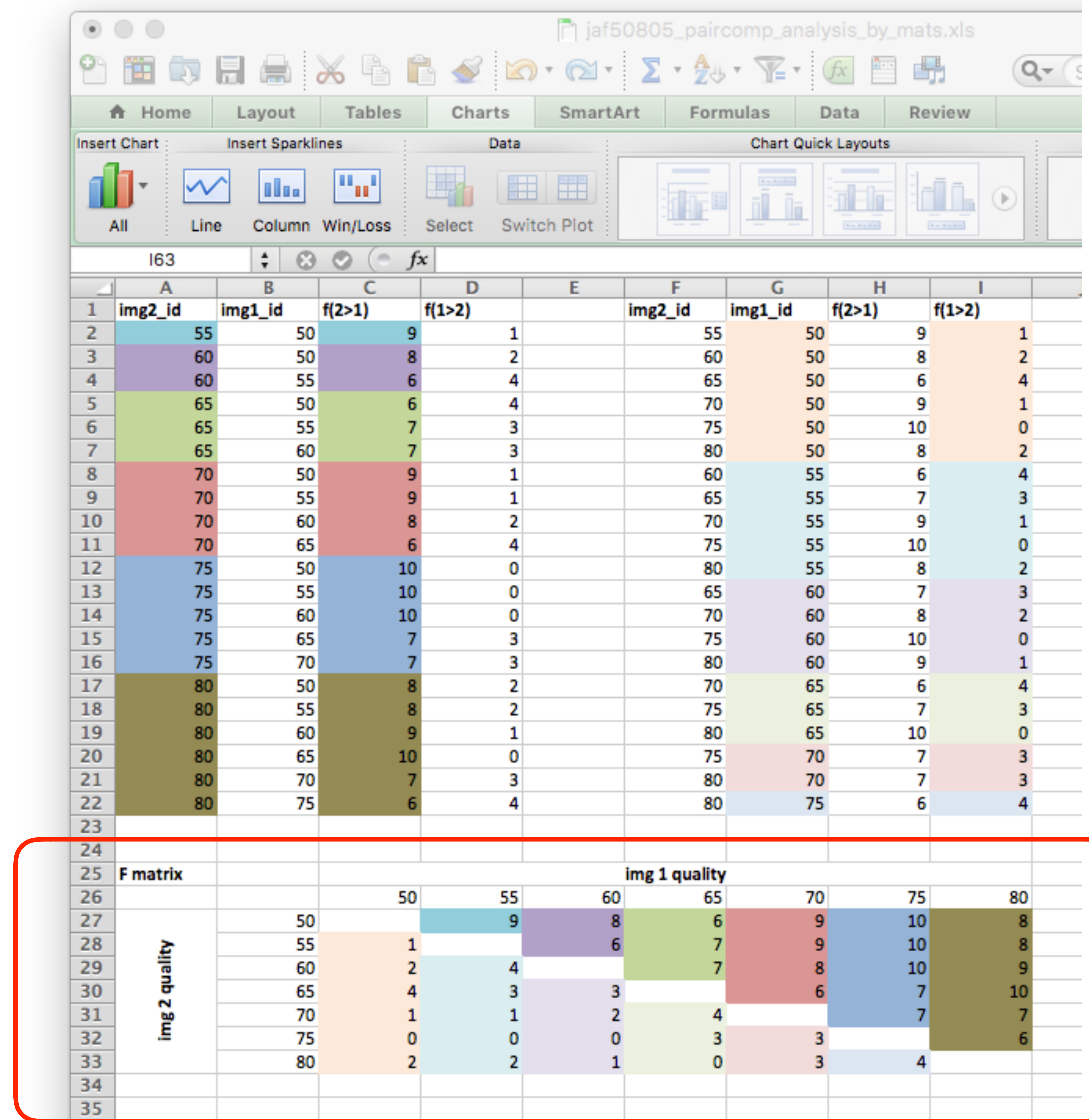
	A	B	C	D	E	F	G	H	I
	img2_id	img1_id	f(2>1)	f(1>2)		img2_id	img1_id	f(2>1)	f(1>2)
1									
2	55	50	9	1		55	50	9	1
3	60	50	8	2		60	50	8	2
4	60	55	6	4		65	50	6	4
5	65	50	6	4		70	50	9	1
6	65	55	7	3		75	50	10	0
7	65	60	7	3		80	50	8	2
8	70	50	9	1		60	55	6	4
9	70	55	9	1		65	55	7	3
10	70	60	8	2		70	55	9	1
11	70	65	6	4		75	55	10	0
12	75	50	10	0		80	55	8	2
13	75	55	10	0		65	60	7	3
14	75	60	10	0		70	60	8	2
15	75	65	7	3		75	60	10	0
16	75	70	7	3		80	60	9	1
17	80	50	8	2		70	65	6	4
18	80	55	8	2		75	65	7	3
19	80	60	9	1		80	65	10	0
20	80	65	10	0		75	70	7	3
21	80	70	7	3		80	70	7	3
22	80	75	6	4		80	75	6	4
23									
24									
25	F matrix					img 1 quality			
26			50	55	60	65	70	75	80
27		50		9	8	6	9	10	8
28		55	1		6	7	9	10	8
29		60	2	4		7	8	10	9
30		65	4	3	3		6	7	10
31		70	1	1	2	4		7	7
32		75	0	0	0	3	3		6
33		80	2	2	1	0	3	4	
34									
35									



10. Create a second copy of this array as shown.

11. Sort the data in this new array by “img1_id” then by “img2_id”.

Lab 5 assignment: pair comparison analysis



	A	B	C	D	E	F	G	H	I
	img2_id	img1_id	f(2>1)	f(1>2)		img2_id	img1_id	f(2>1)	f(1>2)
1									
2	55	50	9	1		55	50	9	1
3	60	50	8	2		60	50	8	2
4	60	55	6	4		65	50	6	4
5	65	50	6	4		70	50	9	1
6	65	55	7	3		75	50	10	0
7	65	60	7	3		80	50	8	2
8	70	50	9	1		60	55	6	4
9	70	55	9	1		65	55	7	3
10	70	60	8	2		70	55	9	1
11	70	65	6	4		75	55	10	0
12	75	50	10	0		80	55	8	2
13	75	55	10	0		65	60	7	3
14	75	60	10	0		70	60	8	2
15	75	65	7	3		75	60	10	0
16	75	70	7	3		80	60	9	1
17	80	50	8	2		70	65	6	4
18	80	55	8	2		75	65	7	3
19	80	60	9	1		80	65	10	0
20	80	65	10	0		75	70	7	3
21	80	70	7	3		80	70	7	3
22	80	75	6	4		80	75	6	4
23									
24									
25	F matrix								
26									
27			50	55	60	65	70	75	80
28		50		9	8	6	9	10	8
29		55	1		6	7	9	10	8
30		60	2	4		7	8	10	9
31		65	4	3	3		6	7	10
32		70	1	1	2	4		7	7
33		75	0	0	0	3	3		6
34		80	2	2	1	0	3	4	
35									

12. The data in the f(2>1) and f(1>2) columns represent the frequencies with which the first images were judged to be higher in quality than the second images. They have been color-coded for clarity

13. Use the “f(...)” data from the two arrays to construct the F matrix.

Lab 5 assignment: pair comparison analysis

jaf50805_paircomp_analysis_by_mats.xls

	A	B	C	D	E	F	G	H	I
1	F matrix		img 1 quality						
2			50	55	60	65	70	75	80
3	img 2 quality	50		9	8	6	9	10	8
4		55	1		6	7	9	10	8
5		60	2	4		7	8	10	9
6		65	4	3	3		6	7	10
7		70	1	1	2	4		7	7
8		75	0	0	0	3	3		6
9		80	2	2	1	0	3	4	
10									
11									
12	P matrix		img 1 quality						
13			50	55	60	65	70	75	80
14	img 2 quality	50		0.9	0.8	0.6	0.9	1	0.8
15		55	0.1		0.6	0.7	0.9	1	0.8
16		60	0.2	0.4		0.7	0.8	1	0.9
17		65	0.4	0.3	0.3		0.6	0.7	1
18		70	0.1	0.1	0.2	0.4		0.7	0.7
19		75	0	0	0	0.3	0.3		0.6
20		80	0.2	0.2	0.1	0	0.3	0.4	
21									
22									
23	Z matrix		img 1 quality						
24			50	55	60	65	70	75	80
25	img 2 quality	50		1.28	0.84	0.25	1.28	#NUM!	0.84
26		55	-1.28		0.25	0.52	1.28	#NUM!	0.84
27		60	-0.84	-0.25		0.52	0.84	#NUM!	1.28
28		65	-0.25	-0.52	-0.52		0.25	0.52	#NUM!
29		70	-1.28	-1.28	-0.84	-0.25		0.52	0.52
30		75	#NUM!	#NUM!	#NUM!	-0.52	-0.52		0.25
31		80	-0.84	-0.84	-1.28	#NUM!	-0.52	-0.25	
32									
33									
34	scale values		-0.90	-0.32	-0.31	0.10	0.43	0.27	0.75
35	JNDs		0.28	0.65	0.57	0.32	0.56	0.30	0.26
36									
37									
38									

14. Copy the F matrix to a new spreadsheet page.

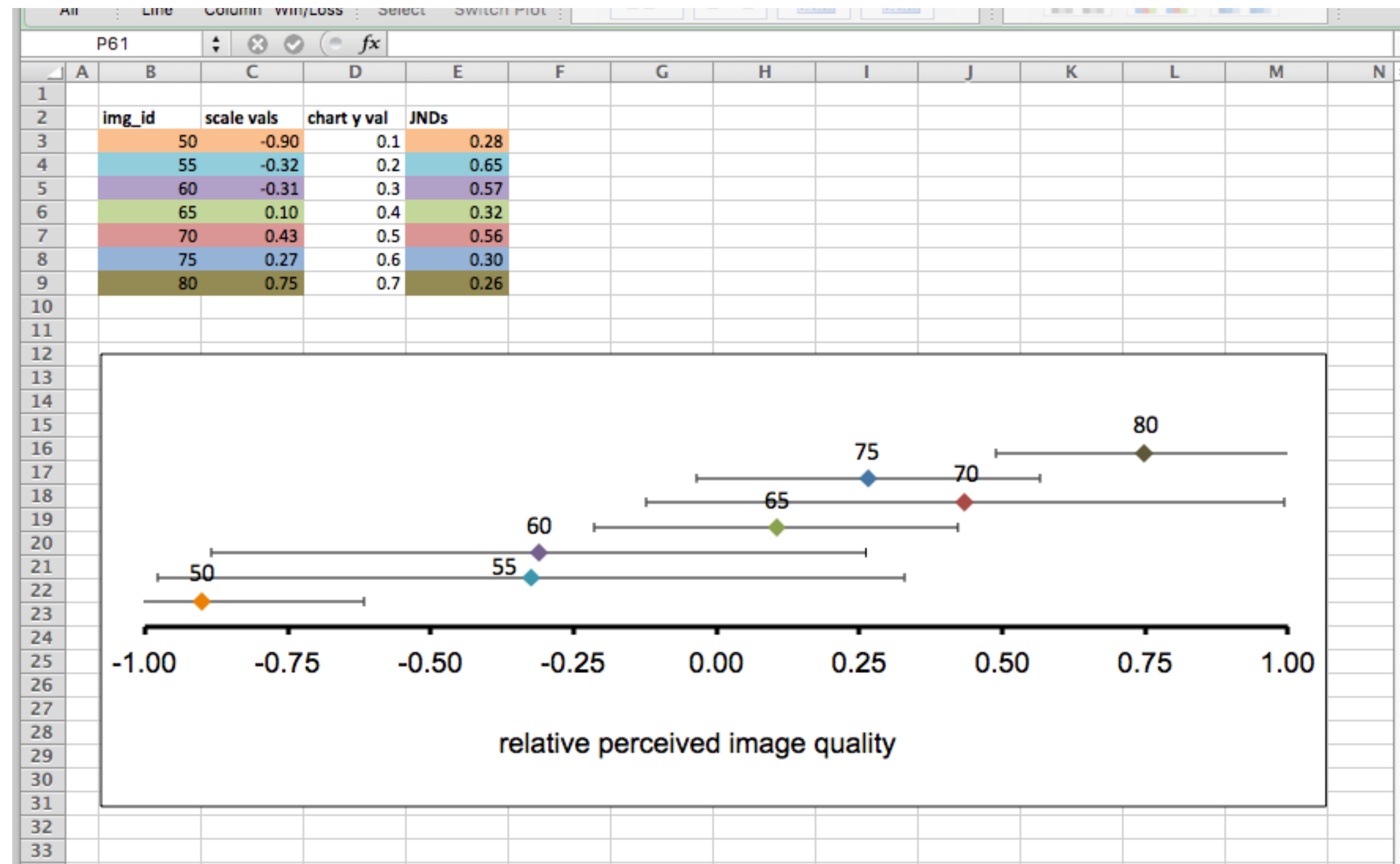
15. Create the P matrix by dividing all the elements in the F matrix by 10.

16. Create the Z matrix by using the NORMSINV function to calculate z-scores from the values in the P matrix.

17. Calculate the scale values by using the AGGREGATE(1,6,"col z-scores") function to calculate column averages of the values in the Z matrix.

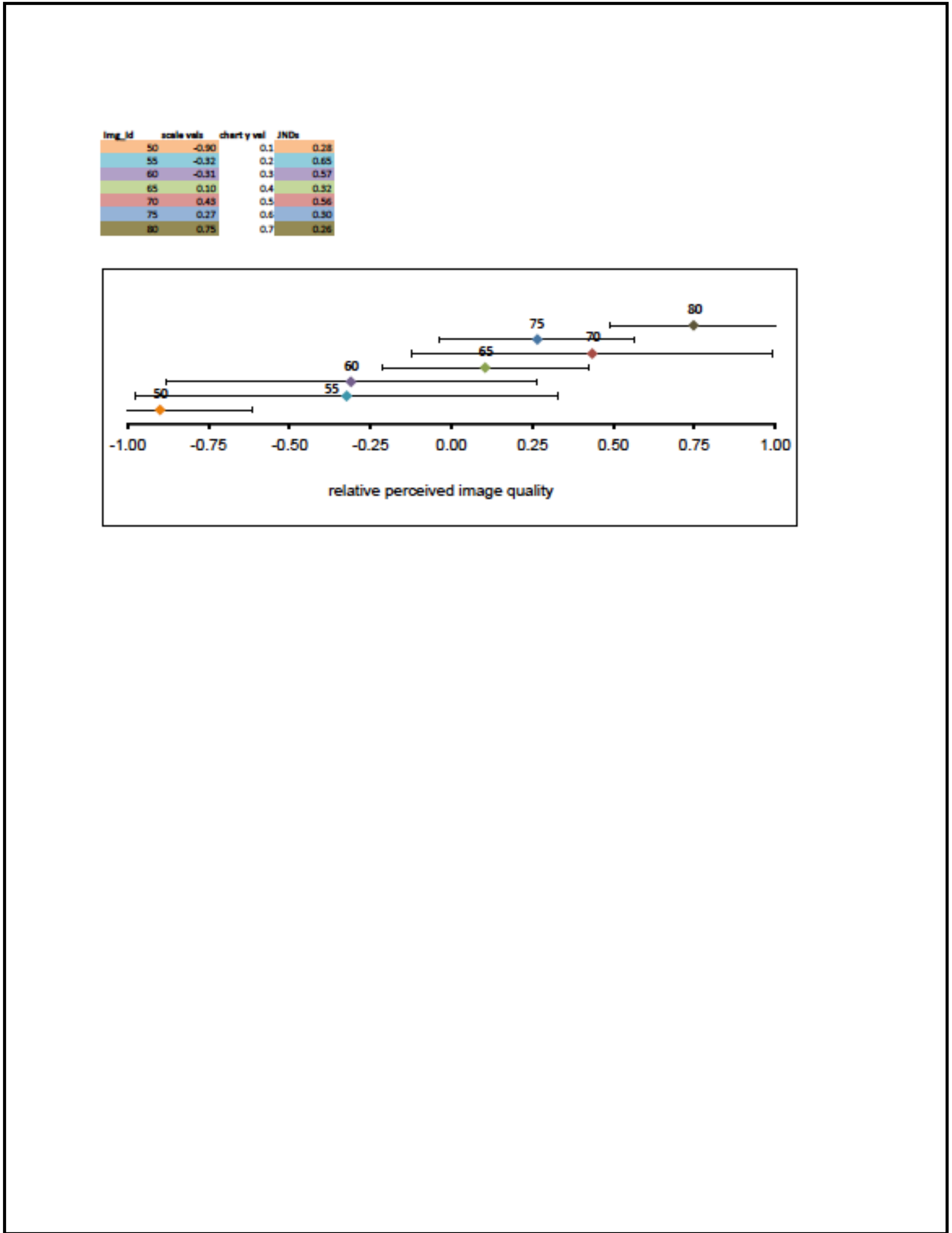
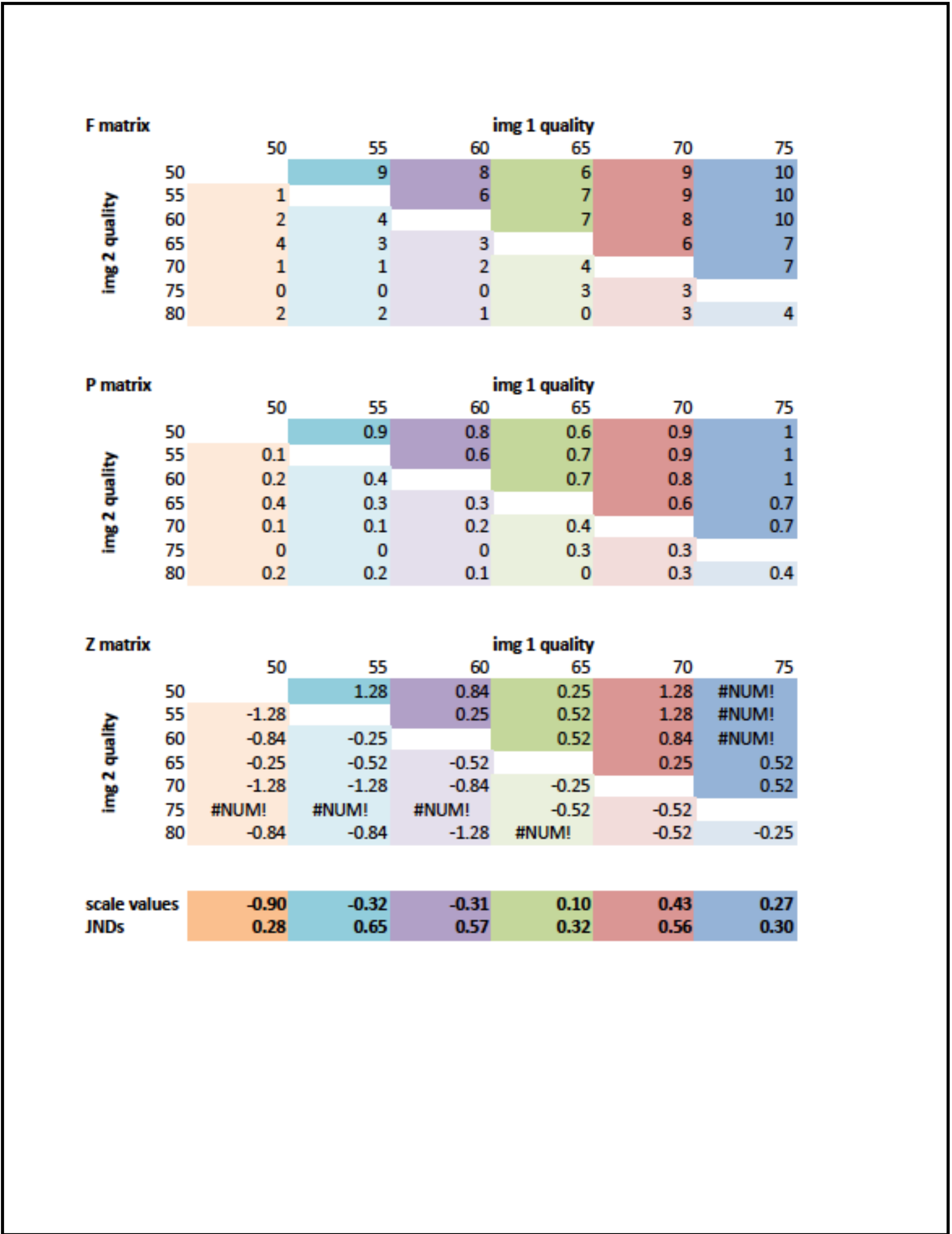
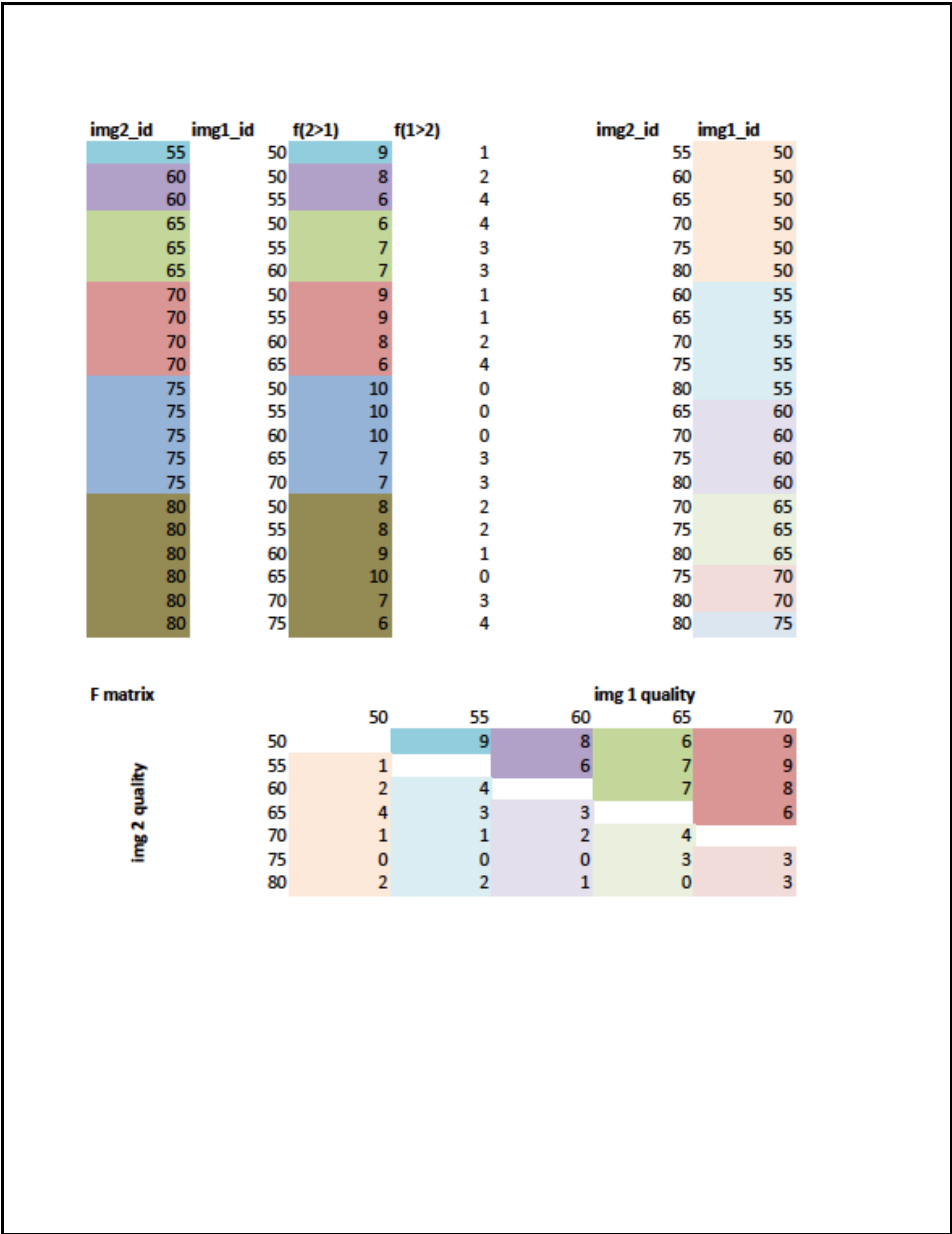
18. Estimate JNDs for each image scale value by using the function $= 0.67 * \text{AGGREGATE}(7,6,"col z-scores")$ to calculate $0.67 * \text{stdev}(\text{col z-scores})$.

Lab 5 assignment: pair comparison analysis



19. Copy the img_id's, scale values, and JNDs to a new spreadsheet page.
20. Insert a column named "chart y val" that contains the series 0.1-0.7 in 0.1 increments.
21. Visualize the results of the experiment by creating a scatter plot like the one shown.
The x's are the scale vals, and y's are the chart y val's.
 - 21.1. The colorcoding of the data points can be done by doubleclicking on the point and selecting "Format Data Point..."
 - 21.2. The individual JND error bars can be created by clicking once on the points to select the data series, and then selecting "Error Bars" and "Custom"
 - 21.3. The data point labels can be inserted by selecting the "Smart Art" tab and then "Inserting" a "Text Box".

Lab 5 assignment: pair comparison results



22. Create a three-page PDF that documents your analysis of the experimental data as shown.

Lab 5 assignment: submission

23. Create a zip file named **yourlastname_lab5.zip** that contains the following

23.1. The original .csv data files from your run of the experiment.

23.2. The .xlsx files that contain your analysis of the data from the experiment.

23.3. The three-page PDF you created in step 22

24. Submit the zip file to the lab5 dropbox by the due date

If for some reason your analysis is not working out, contact me for help and advice on how to proceed. For this reason do not wait until the last minute to do this assignment.